

Section II (Remarks)

A. Summary of Amendment to the Claims

By the present Amendment, claims 1, 35, and 46 have been amended. Claims 33, 34, 39, and 41-45 were previously cancelled. Claim 46 has been amended solely to eliminate ‘means-function’ language.

The amendments made herein are fully consistent with and supported by the originally-filed disclosure of this application. No new matter within the meaning of 35 U.S.C. §132(a) has been introduced by the foregoing amendments.

B. Acknowledgement of Allowable Subject Matter and Response to Claim Objections

In the December 16, 2009 Office Action, claims 32, 37, 38, 40, and 46 were indicated to be allowable over the prior art of record in the present application.

Claims 10-17, 22-24, 30, and 31 were objected to as being dependent upon a rejected base claim, but were indicated to be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Each of the foregoing claims depends (whether directly or indirectly) from claim 1. In view of the amendments to claim 1 herewith, no amendments have been made to any of claims 10-17, 22-24, 30, and 31.

C. Response to Claim Rejections Under 35 U.S.C. 102(b)

The December 16, 2009 Office Action contained multiple rejections under 35 U.S.C. 102(b), namely:

- a rejection of claims 1-9, 18-21, 25, 26, 35, 36, and 47 under 35 U.S.C. 102(b) as allegedly being anticipated by U.S. Patent No. 4,338,281 to Treitinger et al. (hereinafter “Treitinger”); and
- a rejection of claims 1-9, 18-21, 25, 26, 35, 36, and 47 under 35 U.S.C. 102(b) as allegedly being anticipated by U.S. Patent No. 4,447,397 to Anouchi (hereinafter “Anouchi”).

Such rejections are traversed in application to the claims as amended or otherwise presented herewith.

1. Law Regarding Anticipation

“Anticipation requires the disclosure in a single prior art reference of each element of the claim under consideration¹.” It is not enough that the prior art reference disclose all the claimed elements in isolation. Rather, **“anticipation requires the presence in a single prior art reference disclosure of each and every element of the claimed invention, arranged as in the claim².”**

The standard for anticipation is not satisfied where the prior art reference merely discloses the “concept,” “essence,” “key,” or “gist” of the patented invention, as “concepts do not anticipate³.” Anticipation cannot be predicated on teachings in a reference that are vague or based on conjecture⁴.

An allegation that a prior art reference anticipates a patent claim cannot be based on sections of a reference taken in isolation; rather **“the cited sections must be read in context⁵.”** This is consistent with the pronouncement of the Federal Circuit that “[t]he well established rule of law is that **each prior art reference must be evaluated as an entirety, and that all of the prior art must be evaluated as a whole⁶.”**

2. Patentable Distinctions of Applicants’ Claims Over Treitinger

Treitinger is directed to a thin film semiconductor gas sensor having an integrated heating element and a metal oxide semiconductor sensor layer, wherein resistance of the semiconductor sensor layer changes in response to the nature and concentration of a detected gas species (e.g., Treitinger, col. 4, lines 52-56). At column 3, lines 33-57, Treitinger states:

¹ *W.L. Gore & Assocs. v. Garlock*, 721 F.2d 1540, 220 USPQ 303, 313 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984).

² *Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co.*, 730 F.2d 1452, 221 USPQ 481, 485 (Fed. Cir. 1984) (emphasis added); *see also Glaverbel Societe Anonyme v. Northlake Marketing & Supply Inc.*, 33 USPQ2d 1496, 1498 (Fed. Cir. 1995) (“Anticipation ... requires identity of invention: the claimed invention, as described in appropriately construed claims, must be the same as that of the reference, in order to anticipate.”)

³ *Panduit Corp. v. Dennison Mfg. Co.*, 774 F.2d 1082, 1101 (Fed. Cir. 1985).

⁴ *Datascope Corp. v. SMEC, Inc.*, 776 F.2d 320 (Fed. Cir. 1985).

⁵ *In re Chmiel and O’Leary*, 262 F.2d 81, 120 USPQ 188, 190 (C.C.P.A. 1958) (emphasis added).

⁶ *Panduit Corp. v. Dennison Mfg. Co.*, 774 F.2d 1082, 227 USPQ 337, 344 (Fed. Cir. 1985) (emphasis added).

The metal oxide **semiconductor layer 6 functions, at elevated temperatures, as a sensor for a select gas in air**, for example, the exemplary SnO₂ layer functions as a sensor for ethyl alcohol vapors in air. Such metal oxide semiconductor layer is preferably about 50 nm thick and can be composed of select metal oxide semiconductors, such as the earlier mentioned tin oxide or platinum oxide or palladium oxide (sensors for carbon monoxide or hydrocarbons, respectively) or tin oxide having additions of niobium, vanadium, titanium and molybdenum (sensors for propane). Two spaced-apart metal contact strips 7 and 8 are vaporized on the sensor layer 6 as shown. Connection wires 9 and 10 are joined to the heating layer 3 via contact strips 4 and 5 and connection wires 11 and 12 are joined to the sensor layer 6 via contact strips 7 and 8. Connection wires 9 and 10 feed a current from a suitable source (not shown) to layer 3 for heating the same and wires 11 and 12 are connected to a **resistance sensor** (not shown) **for determining any changes in electrical resistance in layer 6 upon the presence of a given gas in air**. Preferably, the connection wires 9, 10, 11 and 12 have a diameter of about 25 to 100 µm and can be composed of a metal selected from the group consisting of platinum, gold, aluminum and nickel.

Treitinger therefore discloses that the metal oxide semiconductor layer experiences a change in resistance in exposure to a changing concentration of gas, and that the sensed gas may be ethyl alcohol vapor, carbon monoxide, hydrocarbons, or propane.

In the December 16, 2009 Office Action, the examiner pointed to Treitinger's connection wires 9, 10, 11, and 12 (which may be composed of nickel) as constituting "gas sensing filament comprising nickel or nickel alloy" within the scope of Applicant's independent claims 1 and 35.

Applicant disagrees with the examiner's suggestion that Treitinger's connection wires constitute "gas sensing filaments" within the scope of Applicant's claims. Claims 1 and 35 have been amended to even more clearly distinguish Treitinger.

Amended claim 1 states:

1. A gas sensor assembly comprising a gas-sensing filament comprising nickel or nickel alloy, adapted for detecting a change in at least one property of said gas-sensing filament upon contact with a target gas species and responsively generating an output signal correlative of the change in at least one property and indicative of presence of said target gas species.

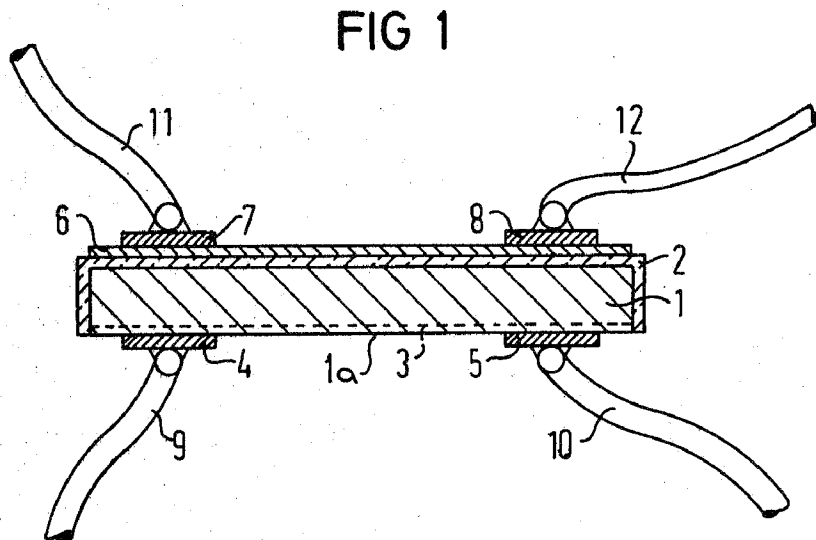
Amended claim 35 states:

35. A gas sensor assembly comprising an electrochemically-thinned gas-sensing filament comprising nickel or nickel alloy, wherein said filament is characterized by an

average diameter of not more than 50 microns, wherein at least one property of the gas-sensing filament experiences detectable change in exposure to presence or change in concentration of the target gas species, and the gas sensor assembly is adapted to generate an output signal correlative of the change of the at least one property of the gas-sensing filament.

Treitinger's connection wires 9 and 10 are arranged to supply current to the heating layer 3. No portion of Treitinger's heating circuit is arranged to generate any output signal correlative of any change in property of a gas sensing filament.

Treitinger's connection wires 11 and 12 are joined to the semiconductor sensor layer 6 via contact strips 7, 8 as shown in Treitinger Figure (reproduced below).



Although Treitinger's connection wires 11, 12 are connected to a resistance sensor, Treitinger makes clear that it is not the connection wires 11, 12, but rather the semiconductor layer 6 that experiences a change in resistance in exposure to a changing concentration of gas. Treitinger's connection wires 11, 12 provide a signal transmission function only.

None of Treitinger's connection wires 9, 10, 11, 12 constitute a "gas-sensing filament" within the meaning of Applicants' claims 1 or 35. With respect to claim 1, nothing in Treitinger discloses or suggests that at least one property of a gas sensing filament is subject to change upon contact with a target gas species, wherein the sensor is arranged to generate an output signal correlative of the

change in at least one property. With respect to claim 35, nothing in Treitinger discloses or suggests that that at least one property of a gas sensing filament experiences detectable change in exposure to presence or change in concentration of the target gas species, and that the gas sensor assembly is adapted to generate an output signal correlative of the change of the change of the at least one property of the gas-sensing filament.

Since Treitinger fails to disclose all elements of claims 1 or 35, such claims are not anticipated by Treitinger. Withdrawal of the rejections of such claims under 35 U.S.C. 102(b) is warranted, and is respectfully requested.

Since dependent claims inherently include all of the features of the claims on which they depend (35 U.S.C. 112, fourth paragraph), all claims depending (whether directly or indirectly) from claims 1 or 35 should be withdrawn for at least the same reasons as articulated in connection with claims 1 and 35.

Various dependent claims provide further basis for distinguishing Treitinger, with noteworthy examples identified below.

With respect to dependent claims 2, 29, and 47, nothing in Treitinger discloses or suggests any gas sensor assembly adapted to detect fluoro species.

With respect to dependent claims 25 and 26, nothing in Treitinger discloses or suggests any gas-sensing filament that comprises a porous coating of nickel or nickel alloy.

Such facts provide additional bases for withdrawing the rejections of these dependent claims.

3. *No Basis Exists or Has Been Demonstrated for the Claim Rejections Premised on Anouchi*

In the December 16, 2009 Office Action at page 2, the examiner included a general allegation that claims 1-9, 18-21, 25, 26, 35, 36, and 47 are anticipated (under 35 U.S.C. 102(b)) by Anouchi. Thereafter, the examiner failed to include any discussion or mention of Anouchi. The rejections premised on Anouchi are respectfully traversed.

Initially, it is noted that the Office has not identified where in Anouchi an alleged anticipatory teaching is to be found. It is incumbent upon the Office to provide a *prima facie* case of anticipation with sufficient detail for a patent application to respond to same. No *prima facie* case of anticipation was provided in the December 16, 2009 Office Action.

To the extent that the examiner may somehow be relying on principles of inherency to support alleged anticipation of various claims by Anouchi, the examiner has failed to make the requisite showing to demonstrate entitlement to use of inherency. It is always incumbent on an Examiner to develop reasons supporting a reliance on inherency⁷. To fully develop reasons, the Office must provide reasonable support for invoking inherency. This reasonable support requires “a basis in fact” (evidence) and/or reasoning tending to show that an allegedly inherent feature necessarily flows from the teachings of the applied art⁸. Only after providing this reasonable support does the burden to rebut a claim rejection based on inherency shift to an Applicant⁹.

Anouchi discloses a catalytic gas sensor including an electrically conductive noble metal filament coated with a layer of titanium oxide. Noble metals are widely considered to refer to the following elements: ruthenium, rhodium, palladium, silver, osmium, iridium, platinum, and gold (i.e., the metals of groups VIIb, VIII, and Ib of the second and third transition series of the periodic table)¹⁰. Nickel is **not** considered to be a noble metal.

Nothing in Anouchi teaches or suggests any gas sensing filament comprising nickel or a nickel alloy. For at least this reason, Anouchi fails to anticipate Applicants’ claims 1 or 35, and the rejections of such claims premised on Anouchi should be withdrawn.

Since dependent claims inherently include all of the features of the claims on which they depend (35 U.S.C. 112, fourth paragraph), all claims depending (whether directly or indirectly) from claims 1 or

⁷ MPEP 2112(IV).

⁸ Id., citing *Ex parte Levy*, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990).

⁹ MPEP 2112 (V); MPEP 2112.01(I).

¹⁰ See, e.g., Britannica Online Encyclopedia, <http://www.britannica.com/EBchecked/topic/416979/noble-metal>; see also Wikipedia.org, http://en.wikipedia.org/wiki/Noble_metal (“The noble metals are considered to be (in order of increasing atomic number) ruthenium, rhodium, palladium, silver, osmium, iridium, platinum, gold.”).

35 should be withdrawn for at least the same reasons as articulated in connection with claims 1 and 35.

Accordingly, favorable reconsideration and withdrawal of all rejections under 35 U.S.C. §102 are respectfully requested.

D. Response to Claim Rejections Under 35 U.S.C. 103

In the December 16, 2009 Office Action at page 4 thereof, dependent claims 27-29 were rejected, apparently under 35 U.S.C. 103, as allegedly being obvious over Treitingner in view of “Rico” (assumed to refer to U.S. Patent No. 5,834,627 to Ricco et al. (“Ricco”)). Such rejections are traversed.

a. Law Regarding Obviousness

To support a rejection under 35 U.S.C. 103, **the prior art reference(s) must teach all of the limitations of the claims.** MPEP § 2143.03.

In considering a reference for its effect on patentability, the reference is required to be considered in its entirety, including portions that teach away from the invention under consideration. Simply stated, the prior art must be considered as a whole¹¹. “It is impermissible within the framework of section 103 to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art¹².” The Federal Circuit and its predecessor court have repeatedly held that **if references taken in combination would produce a ‘seemingly inoperative’ device, then such references teach away from the combination** and cannot serve as predicates for a *prima facie* case of obviousness¹³.

¹¹ *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984) (emphasis added); MPEP § 2141.02.

¹² *Application of Wesslau*, 353 F.2d 238, 241 (C.C.P.A. 1965); *Bausch & Lomb, Inc. v. Barnes-Hind/Hydrocurve*, 796 F.2d 443, 448 (Fed. Cir. 1986), *cert. denied*, 484 U.S. 823 (1987).

¹³ *McGinley v. Franklin Sports, Inc.*, 262 F.3d 1339, 60 USPQ2d 1001, 1010 (Fed. Cir. 2001); *Tec Air, Inc. v. Denso Mfg. Mich. Inc.*, 192 F.3d 1353, 52 USPQ2d 1294, 1298 (Fed. Cir. 1999) (proposed combination of references that would be inoperable for intended purpose supports teaching away from combination); *In re*

In *KSR International Co. v. Teleflex Inc.*, 550 U.S. 398, 82 USPQ2d 1385 (2007), the Supreme Court stated that:

“A patent composed of several elements is not proved obvious merely by demonstrating that each element was, independently, known in the prior art. ... [Rather], it can be **important to identify a reason that would have prompted a person of ordinary skill in the relevant art to combine the [prior art] elements in the manner claimed.**¹⁴”

It is fundamental to a proper rejection of claims under 35 U.S.C. § 103 that an examiner must present a convincing line of reasoning supporting the rejection¹⁵. The Supreme Court in *KSR* affirmed the validity of such approach, stating that **“there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness”**¹⁶.”

Following *KSR*, the Federal Circuit held that although “rigid” application of the “teaching, suggestion, or motivation” (“TSM”) test for obviousness is improper, **application of a flexible TSM test remains the primary guarantee against improper “hindsight” analysis**, because a flexibly applied TSM test ensures that the obviousness analysis proceeds on the basis of evidence in existence before time the application was filed, as required by 35 U.S.C. §103. *Ortho-McNeil Pharm. Inc. v. Mylan Labs., Inc.*, 520 F3d 1358, 86 USPQ2d 1196, 1201-02 (Fed. Cir. 2008)

b. Patentable Distinctions of Claims 27-29 Over Treitinger in View of Ricco

Ricco discloses a calorimetric gas sensor that uses a resistively heated, noble metal-coated micromachined polycrystalline silicon filament. As noted previously herein, nickel is not considered a noble metal.

Gordon, 733 F.2d 900, 902, 221 USPQ 1125, 1127 (Fed. Cir. 1984) (inoperable modification teaches away); *In re Spinnoble*, 405 F.2d 578, 587, 160 USPQ 237, 244 (C.C.P.A. 1969) (references teach away from combination if combination produces seemingly inoperative device).

¹⁴ See *KSR*, 82 USPQ2d at 1389 (emphasis added).

¹⁵ See MPEP 2144 (“*Sources of Rationale Supporting a Rejection Under 35 U.S.C. 103*”), citing *Ex parte Clapp*, 227 USPQ 972 (Bd. Pat. App. & Inter. 1985).

¹⁶ See *KSR*, 82 USPQ2d at 1396 (emphasis added).

Claims 27-29 depend (whether directly or indirectly) from claim 1. It has been previously demonstrated herein that Treitinger fails to disclose all elements of Applicant's independent claim 1 as amended herewith. Ricco fails to remedy the above-identified deficiency of Treitinger in disclosing all elements of Applicant's independent claim 1.

c. The Examiner Has Failed to Provide Articulated Reasoning With Some Rational Underpinning to Support the Legal Conclusion of Obviousness

To remedy the admitted deficiencies of Treitinger in disclosing a gas sensor according to claim 27, the examiner points to the disclosure of Ricco, which is specifically directed to a calorimetric gas sensor that uses a resistively heated, noble metal-coated micromachined polycrystalline silicon filament. The reasoning supporting the examiner's combination in this regard is reproduced below.

It would have been obvious to one having ordinary skill in the art at the time of the invention to utilize in Treitinger the support of Rico (*sic, Ricco*) because the pillars provide conductive pathways between the filaments and the means to resistively heat the filaments to make the above combinative (*sic, combination*) more effective.

Treitinger specifically relies upon connecting wires 11, 12 that are bonded to pads 7, 8 on the surface of a semiconductor gas sensing layer 6, to permit current to flow through the gas sensing layer 6. Any proposal to include pillars that would provide a conductive pathway between so-called "filaments" (e.g., Treitinger's connecting wires 11, 12) would generate a conductive circuit that would bypass Treitinger sensing layer 6 entirely. Such modification would render the sensor according to Treitinger inoperative for its intended purpose. This constitutes a *teaching away* from the proposed combination. It is therefore apparent that the reasoning supporting the examiner's hypothetical combination between Treitinger and Ricco lacks articulated reasoning with some rational underpinning to support the legal conclusion of obviousness, as would be required to support an obviousness rejection under 35 U.S.C. 103.

Accordingly, withdrawal of the claim rejections under 35 U.S.C. 103 is warranted, and is respectfully requested.

CONCLUSION

Based on the foregoing, all of Applicants' pending claims are patentably distinguished over the art, and in form and condition for allowance. The examiner is requested to favorably consider the foregoing, and to responsively issue a Notice of Allowance. If any issues require further resolution, the examiner is requested to contact the undersigned attorney at (919) 419-9350 to discuss same.

Respectfully submitted,

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